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TRANSIENT GEOPHYSICAL BASES FOR OSTENSIBLE UFO-RELATED PHENOMENA AND ASSOCIATED VERBAL BEHAVIOR?

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Summary.—Repeated relationships between certain spatial regions and the report of ostensible UFO-like luminosities have suggested the role of as yet unspecified geophysical processes in the production of these events. Since intense, diffuse or spheroid light displays have been reported for centuries either before or during earthquakes and seem to involve piezoelectric-like effects, a model was developed to suggest that similar ionization/luminosities could occur in areas of tectonic stress, without gross seismicity, by the transient, extremely fine localization of otherwise normal geophysical forces. By using known principles of geophysics, electromagnetism, and behavior, predictions from the model can be generated to accommodate the apparent effects of some UFO-related episodes upon non-living and living electromagnetic systems. The testability of the model is emphasized.

Perhaps one of the most common forms of verbal reports concerning unusual experiences involves ostensible column-like or spheroid-like luminous displays which seem to employ mechanisms not known at present. Such luminous displays have been reported by many cultures in time and space. However, due to culture-specific language and perceptual transform differences, many detailed similarities among reports may have been masked. Whereas one culture may label the phenomenon a "dragon," another may identify it as a religious event, while still another may call it a "flying saucer." The recall of such events would be contaminated at least in part by the implicit associations with such labels. Thus the pairing of the verbal label "UFO" with the initially neutral observation of a luminous glow could result in the recall of the event confounded by other previous verbal associations, e.g., "extraterrestrial aliens," of that label.

A major limitation to the analyses of these phenomena, in addition to the reliability of report, involves the failure clearly to specify the relevant stimuli controlling the verbal behavior about unusual experiences. In part, this limitation has been a consequence of an implicit assumption among many theorists that homogeneity of verbal label implies similarity of mechanism and stimulus source. Such an approach does not realize that the same verbal label, e.g., "UFO," may be emitted by a human population in the presence of many different types of stimuli with markedly dissimilar sources or mechanisms.

Recently, more than 7,000 reports of unusual events, including putative occurrences of UFOs, physical parapsychological events, e.g., "psychokinesis," and other so-called "fortean" phenomena, e.g., falls of rocks, frogs, fish, etc.

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from the sky, were classified and sorted by computer (Persinger & Lafrenière, 1976). The data were collected from orthodox scientific journals as well as esoteric magazines and involved a 160-yr. period. After spatial and temporal analyses had been completed, conspicuous and statistically significant space-time patterns became apparent. It was noted (controlling for population change) that clusters of unusual event reports seemed to occur within the same spatial locations over 20-yr. increments, with strong trends for global patterns during peak periods of reporting. The data strongly implied the involvement of as yet unspecified geophysical processes in the display of unusual verbal behavior in the localities. By combining the data patterns with known and theoretical physical mechanisms, a model was generated in order to facilitate accommodation and prediction of some unusual report forms. Selected ramifications of this theory will be discussed.

RATIONALE

It is often forgotten or unrealized that the human species exists upon an extremely thin semi-stable surface beneath which mammoth reactions and forces are constantly in progress. Some of these forces are represented upon the earth's surface; an example would be the geomagnetic field. Still other forces are maintained within the crustal-mantle matrix and become apparent only during abrupt tectonic modifications, e.g., seismic activities. Although the latter phenomena are primarily associated with mechanical movements, other electromagnetic-like transients have been occasionally reported. These events may be the clue to help unravel the mechanisms associated with some UFO-related reports.

Luminous phenomena observed on the ground or in the sky before, during or after earthquakes have been reported for centuries (Derr, 1973). During the last decade unusual lights or "thunderless" lightning were verified before or during the 1966 Taskent, 1971 San Fernando, and 1971 Groznoy earthquakes; recently, Yasui (1974, 1971) published photographs of earthquake lightning taken during the Matsushiro swarm of 1965-1967. According to the classification scheme derived by I. Galli and translated by Terada (1931), earthquake-associated luminous phenomena involve: (1) indefinite instantaneous illuminations, (2) bright flames and emanations, (3) phosphorescent-like sky or clouds, and (4) well defined mobile luminous "masses."

The latter classification involving defined luminous "masses" is most germane to the present study. Over the centuries a multitude of forms have been described for these events. Not surprisingly, the descriptor or metaphor reflects the language and culture. Instances of "flying luminous shields," "paper-lantern-like fireballs," "luminous wheels," "columns of whirling fire on mountains," "pillars of fire" over houses, "football-like luminosities" in the sky, "chains of spheroid glows moving in the same direction," and funnel- or trumpet-like glows have been reported in association with some earthquakes.

Apparent physical properties of such luminosities display a wide range of variability. Spheroid lights have been reported more than 12 hr. before to several minutes after earthquakes. During their occurrence, the luminosities can maintain stable spatial positions on the ground or in the sky for considerable periods of time or "suddenly move upwards and vanish." The movements are by no means smooth and can display marked "right-angle" variations. Color displays have been usually whitish to bluish-purple, although reddish hues are not infrequent.

Several mechanisms have been postulated over the centuries to explain the luminosities. However, it is only recently that Finkelstein and Powell (1970; personal communication) and Finkelstein, Hill, and Powell (1973) have suggested a model with strong theoretical and empirical support. According to their model, tectonic pressures in subsurface areas, e.g., faults, during or just before fracturing (seismic activity) could generate, in appropriate localities, piezoelectric effects. The electric fields associated with such mechanical distortion of prone crystal lattices would generate values of more than 100,000 V/m and be capable of ionizing the local air over large areas. That transient anomalous electric fields can be generated for at least one hour prior to the primary seismic shock was apparent before the Hilo earthquake in 1973, when major modifications in the earth-ionospheric gradients were observed.

The Model

Usually assumptions are made that the representations of deep geophysical forces upon the earth are relatively constant and homogeneous over large spatial areas or at most subject to mild distortions from local crustal architectures. The possibility of geophysical processes transiently (minutes to hours) displayed within extremely localized geometries (less than 100 m diameter) and with marked greater intensity, is usually not considered. However, the existence of highly focused or intensified geophysical forces within a small spatial context for short periods of time still remains a real theoretical probability. This probability is the primary basis for the following model. Essentially, it demands that otherwise normal forces are abnormally enhanced by their brief and highly localized gradients of manifestation.

It is hypothesized that areas prone to tectonic stress and strain release, generally typified by long histories of seismic activity, may be susceptible to the formation of highly localized, transient column-like electric field formations. A possible representation of such a column is presented in Fig. 1 and is intended to reflect a non-fracture-associated miniature of the more vigorous events related to earthquakes. As sub-surface pressures approached criterion values, intense electric fields would be generated within the column and result in transient ionization of the air; the shape of the luminosity, although predominantly spheroid or ellipsoid/cylindrical due to normal physical parameters, would depend upon

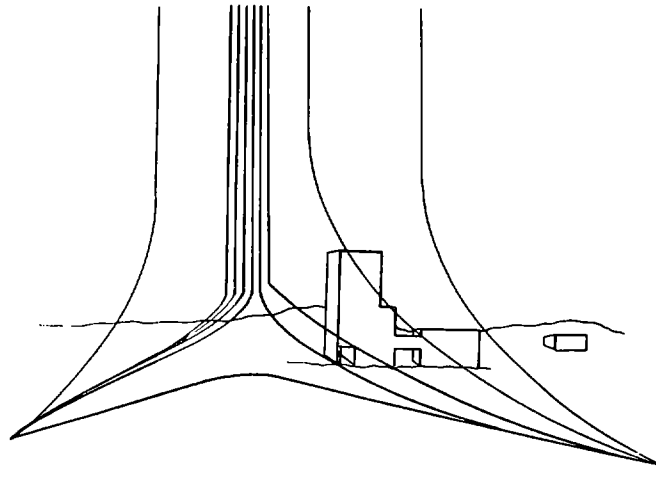

FIG. 1. Pictorial representation of a hypothetical "electric field column" that might be produced by accumulating sub-surface tectonic stresses

the column geometry which would in turn be determined by the local geophysical structures. At least two sources of sub-surface structural deformations could exist: (1) tectonic strains associated with stress release due to internal "seismic-related" forces but without concomitant fracturing and (2) adjustment in local crustal plates following unusually intense and sudden changes in air (pressure) masses. The former source is considered primary.

PREDICTIONS: PHYSICAL EFFECTS

Since the mechanism of luminosity production employs known principles of electric/magnetic phenomena but only applied to rather unusual geometries, a number of predictions can be derived; a few of these will be presented here. In areas prone to such activities, the luminosity should appear on the edges of cliffs or apexes of hills or tops of buildings where coronal-like discharges would be most optimal. Other areas with electrically attractive features, e.g., buried pipe lines, power lines and stations, would also be involved. The shape of the luminosity may be quite variable depending upon the geometrical form attained by the electric field column. Although stationary objects may appear relatively uniform in shape (except for occasional "discharges"), moving objects (associated with changing sub-surface forces) would be expected to change in both shape and perceived color as localized geological (and perhaps man-made) structures modify the column's geometry and direction.

The spatial movement of the luminosity would reflect the vectorial changes in three-dimensional sub-surface pressures and strain release. Consequently, the position of the luminosity could display marked mobility, from almost perfect horizontal or lateral movement to sudden alterations in altitude in either vertical

directions (into the sky or into the ground). Curved or angular movements and quick or slow accelerations would again represent the displacement pattern of the tectonic pressures. Spatial directions should, however, follow normal local pathways of stress release, e.g., fault lines.

Areas prone to seismic activity should, consequently, demonstrate statistical increases in UFO reports. According to Fig. 2, which depicts long-term seismic trends (after Coffman and von Hake, 1973), UFO cluster areas in the U.S.A. should include western California, western Washington, a strip from western Montana to Arizona, a lozenger-shaped area from Arkansas through Illinois-Indiana-Ohio-Michigan, a cluster around the Tennessee-North Carolina-South Carolina-Alabama interface, a strip from central Virginia through eastern Pennsylvania and the New England states, and a cluster in central New York state. Historical accounts of luminous lights should be evident in these areas but may be masked by the labels, e.g., "moving moons," of older cultures. Frequency changes in seismic activity or structural strain should be reflected in the number of UFO reports, although close contiguity (within days) would not be expected.

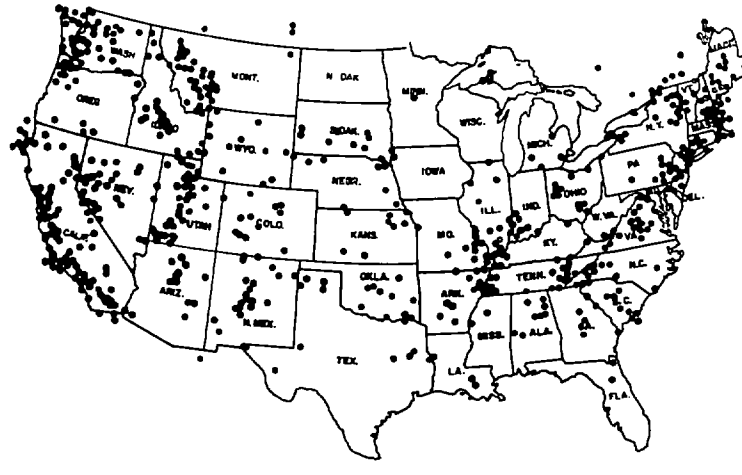

FIG. 2. General earthquake pattern (Modified Mercalli intensities V to IX) in the U.S.A. through 1970. Since some areas have demonstrated repeated seismic episodes, the reader should refer to Coffman and von Hake (1973) for further details. This figure is *not* indicative of severe earthquake risk.

Since the phenomena are predominantly electric expressions, their movement through space would induce a number of electromagnetic disturbances. Changes in or failures of radio transmission/reception, electrical appliances, lighting systems or compasses would be reported proximal to the phenomenon. At sufficient field intensities, movements of dielectrics or orientations of conductors should result. If the fields were time-varying, then frequency-related

inductions in telephone lines (sounds like "whistles," "gasps," etc.) and communication circuits would be expected.

PREDICTIONS: BEHAVIORAL-BIOLOGICAL EFFECTS

The human being is a biological system characterized by a complex of weak electric and magnetic fields. Consequently, the approach of a highly intense electric field column would have both direct and indirect effects. Indirect influences would involve primarily visual and emotional features. For example, as field values fell beneath local ionization potentials, the "UFO" might "suddenly disappear" only to "reappear" somewhere else once the field potentials again achieved criterion levels. The effects of such unusual stimulus presentations upon emotional behavior would be significant. No doubt the kinetics of the phenomenon would be interpreted within an anthropomorphic format. Approach of the luminosity might be interpreted as an "attack" while stable discharge over a given area might be described as "surveillance activity."

Direct effects could be more severe. Close proximity ("encounters") to the field (even below luminogenic potentials) could evoke "tingling/prickly sensations," "apprehension," piloerection, and other unusual subjective behaviors associated with electrostatic fields of high intensity. Movement of the field toward the observer or of the human observer toward the column could induce currents sufficient to produce paralysis or unconsciousness; such experiences have been reported in the laboratory situation with direct current induction (Persinger, 1975; Beal, 1974; Herin, 1968). The stimulation of the electrically unstable portions of the brain, such as the hippocampal formation, could allow the person access to imagery of epileptic, aura-like form. Such imagery would be intense and indistinguishable from "reality." Pre-event amnesia associated with the electric shock-induced alteration in consciousness could allow confabulation characterized by the person's beliefs and fantasies. Direct exposure to intense ionizing radiation associated with the discharge periods should be followed hours to days later by symptoms of erythema/edema ("skin burns"), temporary blindness, eye swelling, nausea, sleep difficulties, and endocrine (especially testicular and thyroidal) disturbances.

Conclusions

Survey of human reports (*Flying Saucer Review*, 1968-1975) concerning intense UFO episodes and ostensible "encounters" suggests a close relationship between the types of experiences often described and the predictions of the present model. However, this model is *not* intended to explain all cases of so-called UFO episodes. No doubt there are many psychological and routine physical manifestations that have been frequently associated with the same verbal label: UFO. Instead, this model has been presented to emphasize the real possibility that unusual displays of normal geophysical forces and concomitant

transient displays of locally intensified electric and magnetic phenomena are responsible for some of the more physical and persistent luminous displays in the environment. Such displays, although infrequent, have been persistent in time and demonstrate repeatable patterns. Their unusual quality seems only a consequence of the context within which they are perceived (reported) and the unusual geometric form in which they are displayed. Perhaps by orienting more toward the abnormal kinetics of the geophysical environment, we can use those principles to understand and *predict* the occurrence of these events and the human behavior associated with them.

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